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(FILE 'HOME' ENTERED AT 14:25:34 ON 05 FEB 2003)

FILE 'CA' ENTERED AT 14:25:43 ON 05 FEB 2003

L1	47364 S HYDROXYAPATITE OR APATITE OR (CALCIUM PHOSPHATE) OR (TRICALCI
L2	346579 S FOAM? OR SCINTER? OR POROUS? OR POROSITY
L3	2381 S L1 AND L2
L4	34509 S IMPLANT
L5	806 S L4 AND L3

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COST IN U.S. DOLLARS

SINCE FILE	TOTAL
ENTRY	SESSION
605.71	605.92

FULL ESTIMATED COST

DISCOUNT AMOUNTS (FOR QUALIFYING ACCOUNTS)

SINCE FILE	TOTAL
ENTRY	SESSION
-96.10	-96.10

CA SUBSCRIBER PRICE

SESSION WILL BE HELD FOR 60 MINUTES

STN INTERNATIONAL SESSION SUSPENDED AT 16:18:47 ON 05 FEB 2003

L8 ANSWER 32 OF 35 CA COPYRIGHT 2003 ACS
 AN 109:156303 CA
 TI Manufacture of calcium phosphate porous materials as bone substitutes and
 adsorbents in biochemical separation
 IN Hakamazuka, Koji; Irie, Hiroyuki
 PA Olympus Optical Co., Ltd., Japan
 SO Jpn. Kokai Tokkyo Koho, 3 pp.
 CODEN: JKXXAF
 DT Patent
 LA Japanese
 FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 63040782	A2	19880222	JP 1986-183590	19860805
PRAI	JP 1986-183590		19860805		

AB Porous Ca phosphate materials are manufd. by mixing cryst.
hydroxylapatite or β - $\text{Ca}_3(\text{PO}_4)_2$ powder with a binder and a
foam-producing agent, making this porous mixt. into a shape,
 drying, heating, eliminating the **foam**-producing agent and binder
 and finally **sintering** at a high temp. Ammonium acrylate polymer
 (10 mL) as a binder was added to 10 g of β - $\text{Ca}_3(\text{PO}_4)_2$ powder
 (1.0×10^{-3} μm) and mixed under the influence of ultrasound waves, and
 then 2 g of polyoxyethylene nonylphenol-ethylene oxide mixt. was added.
 This porous fluid was poured into a mold, dried at 40.degree. for 15 h,
 transferred to an alumina container and **sintered** at 1000.degree.
 for 40 min.

Use resin to
 stabilize green material
 foamed, sintered

L8 ANSWER 30 OF 35 CA COPYRIGHT 2003 ACS
 AN 113:120851 CA
 TI Preparation of porous ceramics as artificial bone and dental materials
 IN Tamura, Naoharu
 PA Asahi Optical Co., Ltd., Japan
 SO Jpn. Kokai Tokkyo Koho, 3 pp.
 CODEN: JKXXAF
 DT Patent
 LA Japanese
 FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 01314572	A2	19891219	JP 1988-147195	19880615
PRAI	JP 1988-147195		19880615		

AB The porous ceramics are prepd. by mixing ceramics powders (calcium phosphate compds. e.g. **hydroxyapatite**) with the blowing agents (e.g. H₂O₂ or egg white) and fibers (e.g. paper products) and **sintered** at 900-1400.degree. after heated at 700.degree. to remove the fibers. Thus, **hydroxyapatite** 100 g, fiber (paper) 6 g, and 30% H₂O₂ 0.9 g were mixed in H₂O 176.9 g, heated at 700.degree. to remove fiber, and **sintered** at 1200.degree. to form the porous ceramics, with 55% porosity.

foaming
 (blowing agents)

8 ANSWER 14 OF 35 CA COPYRIGHT 2003 ACS

AN 133:211771 CA

TI **Sintering** and creation of porous structure of bioactive ceramics

AU Fidancevska, Emilija; Bossert, Jorg; Milosevski, Milosav

CS Faculty of Technology and Metallurgy, University "St Ciril and Methodius",
Skopje, 91000, Yugoslavia

SO Advanced Science and Technology of Sintering, [Proceedings of the World
Round Table Conference on Sintering], 9th, Belgrade, Yugoslavia, Sept.
1-4, 1998 (1999), Meeting Date 1998, 237-243. Editor(s): Stojanovic,
Biljana D.; Skorokhod, Valery Vladimirovich; Nikolic, Maria Vesna.
Publisher: Kluwer Academic/Plenum Publishers, New York, N. Y.
CODEN: 69ACSR

DT Conference

LA English

AB **Hydroxyapatite** ceramics were prepd. with 2 types of structures,
dense compacts and porous sponge. Porous materials were prepd. by 3
methods. 1) Polyethylene **foam** sponge was impregnated by
hydroxyapatite suspension, then pyrolyzing to remove the sponge
and **sintering** the ceramic, leaving the **foam**-like
structure. 2) C fibers were added to a **hydroxyapatite**
suspension, followed by drying and **sintering** to pyrolyze the
carbon fibers. 3) H2O2 was added to a **hydroxyapatite** suspension
as a pore former, followed by casting in Al frame, drying and
sintering. The structure and mech. properties as a function of
porosity were examd. **Hydroxyapatite** porous ceramics prepd.
using H2O2 as a pore former had the best combination of mech. properties
and porosity for use as cortical and cancellous bone.

RE.CNT 5 THERE ARE 5 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT



L5 ANSWER 389 OF 806 CA COPYRIGHT 2003 ACS
AN 129:127105 CA
TI Electrophoretic coatings of **porous apatite** composite
onto alumina ceramics
AU Yamashita, Kimihiro; Yonehara, Eiko; Hamagami, Jun-Ichi; Umegaki, Takao
CS Department of Industrial Chemistry, Tokyo Metropolitan University, Tokyo,
192-03, Japan
SO Bioceramics, Proceedings of the International Symposium on Ceramics in
Medicine (1997), 10, 463-466
CODEN: BPCMF
PB Elsevier Science Ltd.
DT Journal
LA English
AB The coating of **porous hydroxyapatite** on alumina and
zirconia ceramics was undertaken by the electrophoretic lamination method.
The multilayers were comprised of **porous hydroxyapatite**
, intermediate **hydroxyapatite**, and adhesive layer of
calcium phosphate glass. The open **porosity**
and pore size of the surface layers were adjusted by the addn. of graphite
or alumina powders. In the case of alumina additives, the surface layers
were decompd. to **tricalcium phosphate** during
sintering, while **hydroxyapatite** structure was maintained in
graphite-added surfaces.

order

L5 ANSWER 358 OF 806 CA COPYRIGHT 2003 ACS
AN 130:43681 CA
TI Preparation of **porous hydroxyapatite** thin film on
titanium metal substrate by sol-gel process
AU Umeda, Tomohiro; Nishio, Keishi; Watanabe, Yuichi; Tsuchiya, Toshio
CS Department of Materials Science and Technology, Faculty of Industrial
Science and Technology, Science University of Tokyo, Chiba, 278, Japan
SO Phosphorus Research Bulletin (1998), 8, 31-36
CODEN: PREBE7; ISSN: 0918-4783
PB Japanese Association of Inorganic Phosphorus Chemistry
DT Journal
LA English
AB **Hydroxyapatite** (HAp: $\text{Ca}_{10}(\text{PO}_4)_6(\text{OH})_2$) thin films having
porous structure were prepd. by sol-gel process with dip-coating
using calcium acetate ($\text{Ca}(\text{CH}_3\text{COO})_2 \cdot \text{H}_2\text{O}$) and tri-Et phosphate. In
the present study, the surface of titanium metal was coated with a
sodium-titanium oxide layer by sol-gel process treatment with alkali
hydroxide solns. HAp thin film prepd. on modified titanium substrate was
then obtained at 800.degree.C (under transformation point of titanium
metal) so at lower temp. than previous process. Peeling of HAp thin film
was prevented by the formation of sodium-titanium oxide layer. Calcium
oxide free HAp films were synthesized with acetate as a raw material of
calcium and rapid heating at 800.degree.C for 1 h. The films were chem.
bonded to the substrate and had a **porous** structure which was
expected to show a good bioactivity.

RE.CNT 8 THERE ARE 8 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

NSWER 2 OF 4 CAPLUS COPYRIGHT 2003 ACS

AN 2001:850734 CAPLUS

DN 135:376834

TI Biomaterial comprising **calcium phosphate sintered** body

IN Ochi, Takahiro

PA Mmt Co., Ltd, Japan; Toshiba Ceramics Co., Ltd.

SO Eur. Pat. Appl., 47 pp.

CODEN: EPXXDW

DT Patent

LA English

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	EP 1155705	A2	20011121	EP 2001-112106	20010517
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO				
	JP 2002017846	A2	20020122	JP 2000-294841	20000927
	JP 2002102328	A2	20020409	JP 2000-294842	20000927
	JP 2002102329	A2	20020409	JP 2000-294843	20000927
PRAI	JP 2000-148561	A	20000519		
	JP 2000-294841	A	20000927		
	JP 2000-294842	A	20000927		
	JP 2000-294843	A	20000927		

AB A **porous** body is a calcium phosphates **sintered** body having a no. of substantially globular **pores**. A **porosity** is not less than 55% and not more than 85%, and simultaneously, and a mean **pore** diam. is not less than 50 .mu.m and not more than 800 .mu.m. A **pore** having a size larger than the mean **pore** diam. has at least three communicating **pores** having a diam. of not less than 5 .mu.m, on the av., and simultaneously, a **pore** having at least the three communicating **pores** has at least one communicating **pore** having a diam. of not less than 25 .mu.m, on the av. The total opening area of the communicating **pore** which is possessed by the **pore** having a size larger than the mean **pore** diam. occupies the ratio of not more than 50% of the **pore** surface area. In a dry state, it is possible to wet the whole the **porous** body by dropping water and **blood**.

L3 ANSWER 3 OF 4 CAPLUS COPYRIGHT 2003 ACS

AN 1997:268598 CAPLUS

4

L5 ANSWER 260 OF 806 CA COPYRIGHT 2003 ACS
AN 132:339198 CA
TI Treatment of osteomyelitis by using antibiotic-loaded **porous**
ceramic
AU Itokazu, M.; Itoh, Y.; Fukuta, M.; Miyamoto, K.; Ohara, A.; Oshima, K.;
Nishimoto, Y.; Ohno, T.; Kasai, T.; Shimizu, K.
CS Department of Orthopaedic Surgery, Gifu University School of Medicine,
Gifu, 500-8705, Japan
SO Bioceramics, Proceedings of the International Symposium on Ceramics in
Medicine (1999), 12, 3-6
CODEN: BPCMPX
PB World Scientific Publishing Co. Pte. Ltd.
DT Journal
LA English
AB **Porous hydroxyapatite** block (HAB) could be used as a
sustainer of antibiotics or anticancer drugs because of its interlinked
pore structure. HAB was mixed with an antibiotic soln. and decompressed
in vacuum container under from 5 to 10 in. (127-254 mm) Hg/20 min. to load
antibiotics into HAB-pores. Twenty-one patients with osteomyelitis
including one with tuberculosis and 5 patients with infected joint
replacement had been treated in combination with an i.v. injection. On
follow up study (from 8 to 85 mo; averaged 41.5 mo), all of the foci had
completely healed primarily by the end of the follow-up period except a
case which was used on the open tibial fracture with a plate fixation.
These new methods are simple, can be performed safely to treat
osteomyelitis as a 1-stage operation.
RE.CNT 9 THERE ARE 9 CITED REFERENCES AVAILABLE FOR THIS RECORD

added

L8 ANSWER 13 OF 35 CA COPYRIGHT 2003 ACS

AN 133:355273 CA

TI Calcium phosphate-based porous **sintered** body and its production method.

IN Imura, Koichi; Uemoto, Hideo; Hojo, Akimichi; Tanaka, Junzo; Kikuchi, Masanori; Suetsugu, Yasushi; Yamazaki, Hiroshi; Kinoshita, Masami; Minowa, Nobuaki

PA Toshiba Ceramics Co., Ltd., Japan; Science and Technology Agency National Institute for Research In Inorganic M; Toshiba Denko Co., Ltd.

SO Jpn. Kokai Tokkyo Koho, 8 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
	-----		-----	-----	-----
PI	JP 2000302567	A2	20001031	JP 1999-105579	19990413
	GB 2348872	A1	20001018	GB 2000-9085	20000412
	DE 10018394	A1	20001207	DE 2000-10018394	20000413
	<u>US 6340648</u>	B1	20020122	US 2000-548742	20000413
PRAI	JP 1999-105579	A	19990413		

AB The invention provides a calcium phosphate-based porous **sintered** body having sufficient mech. strength and biocompatibility, suitable for use as a bone prosthetic material, etc., wherein the **sintered** body has a porosity of 55-90 %, and continuous spherical pores with pore diams. of .gtoreq. 150 .mu.m and an av. diam. of the continuum portion of .gtoreq. 50 .mu.m, and wherein the three-point bending strength of the **sintered** body is .gtoreq. 5 MPa. A porous **sintered** body was prep'd. from **hydroxyapatite** powder, water solvent, polyethyleneimine binder, polyoxyethylene lauryl ether **foaming** agent, and sorbitol polyglycidyl ether crosslinking agent.

L8 ANSWER 8 OF 35 CA COPYRIGHT 2003 ACS
AN 134:371850 CA
TI Process for producing rigid reticulated articles
IN Marx, Jeffrey G.; Heckendorf, Bradley R.; Johnson, James R.; Venarsky,
John Jeffrey
PA Phillips-Origen Ceramic Technology, LLC, USA
SO PCT Int. Appl., 36 pp.
CODEN: PIXXD2
DT Patent
LA English
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2001036013	A1	20010525	WO 2000-US20734	20000731
	W:	AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM			
	RW:	GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG			
	EP 1231951	A1	20020821	EP 2000-955280	20000731
	R:	AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL			
	PRAI US 1999-440144	A	19991115		
	WO 2000-US20734	W	20000731		

AB A process for producing a rigid reticulated article includes: (a) providing a first dispersion of a ceramic or metal powder, a binder, and a solvent; (b) providing a reticulated substrate which has open, interconnected porosity; (c) contacting the reticulated substrate with the first dispersion to coat the substrate with the dispersion to form a first coating; (d) drying the coated reticulated substrate; (e) contacting the reticulated substrate with 1 or more addnl. dispersions to form addnl. coatings wherein the compn. of the addnl. coatings are the same or different from each other and the first coating; (f) drying the addnl. coating between the steps of contacting; (g) heating the coated reticulated substrate at a time and temp. sufficient to pyrolyze any org. components; and (h) **sintering** to form a ceramic or metal or composite reticulated article. In another aspect, the binder becomes solvent-insol. and flexible upon drying. According to this aspect, one or more addnl. coatings may optionally be used. Thus, a stainless steel reticulated **foam** was prepd. from stainless steel-316 715, D-3021 dispersant 7.5, B-1000 binder 100.5, Surfynol-420 2.5, and Nopco NXZ 10 g, and water 105 mL.

RE.CNT 3 THERE ARE 3 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

8/1 US Case

*

L5 ANSWER 248 OF 806 CA COPYRIGHT 2003 ACS
AN 132:352717 CA
TI **Porous hydroxyapatite** prepared by gel casting of
foams for biomedical applications
AU Sepulveda, P.; Pandolfelli, V. C.; Rogero, S. O.; Higa, O. Z.; Bressiani,
J. C.
CS Departamento de Engenharia de Materiais Universidade Federal de S. Carlos,
S. Carlos, 13565-905, Brazil
SO Ceramica (Sao Paulo) (1999), 45(296), 198-202
CODEN: CMCAAG; ISSN: 0366-6913
PB Associacao Brasileira de Ceramica
DT Journal
LA English
AB A novel technique has been applied to manuf. **porous**
hydroxyapatite for **implant** applications. The process
involved generation of **foam** from an aq. suspension of the powder
followed by in situ polymn. of org. monomers, which had been previously
added to the compns. This method produces strong gelled and
complex-shaped bodies with up to 90% **porosity** that can withstand
machining in the green state. The org. additives are eliminated at temps.
above 300.degree.C and sintering is carried out for consolidation of the
ceramic matrix. An optimized mech. strength results from a highly
densified matrix combined with spherical interconnected cells of diam.
ranging from 20 to 1000 .mu.m and channels of 10-100 .mu.m, depending on
the specimen d. Cytotoxicity test was conducted with sintered HA exts. in
contact with mammalian cells, based on a quant. method of colonies
formation suppression. The in vitro test revealed that the original
purity of the biomedical-grade **hydroxyapatite** powder was neither
affected through processing nor by the employed reagents.
RE.CNT 14 THERE ARE 14 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L5 ANSWER 336 OF 806 CA COPYRIGHT 2003 ACS
 AN 130:357096 CA
 TI Role of interconnections in **porous** bioceramics on bone recolonization in vitro and in vivo
 AU Lu, J. X.; Flautre, B.; Anselme, K.; Hardouin, P.; Gallur, A.; Descamps, M.; Thierry, B.
 CS Institut de Recherche sur les Maladies du Squelette (IRMS), Berck-Sur-Mer, 62608, Fr.
 SO Journal of Materials Science: Materials in Medicine (1999), 10(2), 111-120
 CODEN: JSMMEJ; ISSN: 0957-4530
 PB Kluwer Academic Publishers
 DT Journal
 LA English
 AB The interconnections in a **porous** biomaterial are the pathways between the pores. They conduct cells and vessels between pores. Thus they favor bone ingrowth inside ceramics. The aim of our study was to det. the effect on bone ingrowth of interconnections in 2 ceramics: **hydroxyapatite (HA)** and **.beta.-tricalcium phosphate (.beta.-TCP)** with the same **porosity** of about 50% and a mean pores size of 100-300 .mu.m and a mean interconnection size of 30-100 .mu.m. In vitro, 4 disks for osteoblast culture were studied after 14 and 28 days of incubation. Human osteoblasts can penetrate interconnections over 20 .mu.m in size, and colonize and proliferate inside macropores, but the most favorable size is over 40 .mu.m. In vivo, 8 cylinders were implanted in the middle shaft of both rabbit femurs for 12 or 24 wk. The histomorphometric results show that interconnections in **porous** ceramics favor bone ingrowth inside the macropores. In the HA group the rate of calcification and bone ingrowth do not differ, and chondroid tissue is obsd. inside pores. But in .beta.-TCP, the calcification rate and the bone ingrowth increased significantly. At week 12 significant correlation between new bone ingrowth and the size of the interconnections is obsd. between new bone ingrowth and the d. of pores. In conclusion we notice that in vivo a 20 .mu.m interconnection size only allows cell penetration and chondroid tissue formation; however the size of the interconnections must be over 50 .mu.m to favor new bone ingrowth inside the pores. We propose the concept of "interconnection d." which expresses the quantity of links between pores of **porous** materials. It assures cell proliferation and differentiation with blood circulation and extracellular liq. exchange. In resorbable materials, pore d. and interconnection d. are more important than their size, contrary to unresorbable materials in which the sizes and the densities are equally important.
 RE.CNT 10 THERE ARE 10 CITED REFERENCES AVAILABLE FOR THIS RECORD
 ALL CITATIONS AVAILABLE IN THE RE FORMAT

L5 ANSWER 379 OF 806 CA COPYRIGHT 2003 ACS
AN 129:180186 CA
TI Method for preparing bone substitutes with controlled porosity
IN Richart, Olivier; Szarzynski, Stephan
PA S.H. Industries, Fr.
SO PCT Int. Appl., 37 pp.
CODEN: PIXXD2

DT Patent
LA French

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 9834654	A1	19980813	WO 1998-FR213	19980205
	W:	AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, GW, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM			
	RW:	GH, GM, KE, LS, MW, SD, SZ, UG, ZW, AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG			
	FR 2758988	A1	19980807	FR 1997-1309	19970205
	FR 2758988	B1	20000121		
	AU 9862983	A1	19980826	AU 1998-62983	19980205
	EP 964707	A1	19991222	EP 1998-906978	19980205
	EP 964707	B1	20011004		
	R:	AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, FI			
	JP 2001510375	T2	20010731	JP 1998-533875	19980205
	AT 206313	E	20011015	AT 1998-906978	19980205
	ES 2161517	T3	20011201	ES 1998-906978	19980205
	US 6316091	B1	20011113	US 1999-367017	19991112
PRAI	FR 1997-1309	A	19970205		
	WO 1998-FR213	W	19980205		

AB The invention concerns a method for prepg. macro-porous synthetic ceramics designed in particular for bone substitution. The invention also concerns macroporous synthetic ceramics comprising pores of controlled dimensions, distributed in no. and in surface in a predetd. manner, the interconnection between the pores being controlled.

RE.CNT 4 THERE ARE 4 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

get this ↑

ANSWER 219 OF 806 CA COPYRIGHT 2003 ACS

AN 133:256715 CA
TI Effect of various properties of **hydroxyapatite** ceramics on
osteochonduction and stability
AU Kurioka, Kazuhito; Umeda, Masahiro; Teranobu, Osamu; Komori, Takahide
CS Department of Oral and Maxillofacial Surgery, Kobe University School of
Medicine, Japan
SO Kobe Journal of Medical Sciences (1999), 45(3-4), 149-163
CODEN: KJMDA6; ISSN: 0023-2513
PB Kobe University School of Medicine
DT Journal
LA English
AB **Hydroxyapatite** ceramics (HA) are widely used for clin.
applications as a bone substitute or dental **implant** because they
have been shown to be biocompatible and exhibit excellent osteocond. when
grafted into the bone tissue. However, the influence of the phys.
properties of HA on the osteochonduction and stability remains unclear. We
examd. here the effect of various properties of HA granules on
osteochonduction and stability using 6 types of HA granules. The HA
granules were grafted into the rabbit tibia and the initial bone formation
and long-term stability of the new bone were studied histol. The
following results were obtained;. (1) Osteochonduction of the HA granule
was influenced by the shape. Multi-nuclear granules with continuous pores
ranging from 30 to 200 .mu.m in diam. showed both excellent
osteochonduction and stability. (2) Soly. behavior of HA granules, which
was effected by the relative surface area sizes, also seemed to be an
important factor for osteochonduction and stability. (3) Stable bi-phase
ceramics with HA and .beta.TCP were produced at the sintering temp. of
1200.degree. when Mg was added. The .beta.TCP and Mg content did not neg.
influence the initial osteochonduction or long-term stability.
RE.CNT 20 THERE ARE 20 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L

↑
pore size
30-200 μm

L5 ANSWER 272 OF 806 CA COPYRIGHT 2003 ACS
 AN 132:199005 CA
 TI Study on composite artificial bone of bone morphogenetic protein/
porous .beta.-tricalcium phosphate
 AU Wang, Shi-bin; Weng, Lian-jing; Zheng, Chang-qiong; Ran, Jun-quo; Wang,
 Fan-hu; Liang, Ghe; Hu, Yun-yu
 CS School of Chem. Eng., Huaqiao University, Quanzhou, 362011, Peop. Rep.
 China
 SO Sichuan Lianhe Daxue Xuebao, Gongcheng Kexueban (1999), 3(5), 76-82
 CODEN: SLGKF2
 PB Sichuan Lianhe Daxue Xuebao, Gongcheng Kexueban Bianjibu
 DT Journal
 LA Chinese
 AB The composite artificial bone of bone morphogenetic protein/**porous**
.beta.-tricalcium phosphate (BMP/p-.beta.-TCP) with
 ability of osteoinduction and biodegrdn. has been studied. A new process
 prepg. **.beta.-tricalcium phosphate (.beta.-TCP)**
 bioceramic powders has been developed. The problem that very difficult
 filtering of gelatinous ppt. has been solved. The processing parameters
 in molding and sintering were investigated. The results show that Ca/P
 ratio of the prepd. p-.beta.-TCP bioceramic is 1.50, **porosity**
 vol. is 42.3%, diam. of macropores is 400 .mu.m, diam. of micropores is 5
 .mu.m, compressive strength is 34.8 kg/cm². The degrdn. expt. in vitro
 showed that it could be able to solve slightly in normal saline. The
 results of all tests of hemolysis, acute toxicity and pyrogen were found
 within normal range. The results of i.m. implantation test showed that
 BMP/p-.beta.-TCP has good osteoinduction. The BHP/p-.beta.-TCP materials
 were implanted into 1.5 cm radial defects of New Zealand rabbits, it has
 been showed that that bone repairing ability of BMP/p-.beta.-TCP is
 superior to the orthes (p-.beta.-TCP and P-HA) . The BMP/p-.beta.-TCP is
 suitable for substitution of autograft bone on repairing spongy bone
 defects.

L5 ANSWER 186 OF 806 CA COPYRIGHT 2003 ACS
AN 134:120849 CA
TI Materials engineering approaches towards advanced bioceramic coatings on
Ti6Al4V **implants**
AU Heimann, Robert B.; Hemachandra, Khemchai; Itiravivong, Pibul
CS Dep. Mineralogy, Freiberg University of Mining and Technology, Germany
SO Journal of Metals, Materials and Minerals (1999), 8(2), 25-40
CODEN: JMMMCB; ISSN: 0857-6149
PB Chulalongkorn University, Metallurgy and Materials Science Research
Institute
DT Journal
LA English
AB In this contribution several approaches towards engineering of bioceramic
coatings applied by thermal spraying to titanium alloy substrates are
being described. Optimization of plasma spray parameters can be used to
deposit coatings with controlled **porosity**, high adhesive
strength and optimum crystallinity. Microstructural engineering of the
hydroxyapatite powder by pre-spray annealing leads to a
substantial decrease of the microporosity of the ceramic grains.
Moreover, bond coats based on titania and zirconia are being used to
control the rate of heat transfer from the molten particles to the
substrate and hence to improve the resorption resistance by suppressing
the deposition of amorphous **calcium phosphate** (ACP).
RE.CNT 31 THERE ARE 31 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L5 ANSWER 298 OF 806 CA COPYRIGHT 2003 ACS
 AN 131:341920 CA
 TI A preliminary study on osteoinduction of two kinds of **calcium phosphate** ceramics
 AU Yuan, Huipin; Kurashina, Kenji; De Bruijn, Joost D.; Li, Yubao; De Groot, K.; Zhang, Xingdong
 CS Institute of Materials Science and Technology, Sichuan Union University, Chengdu, 610064, Peop. Rep. China
 SO Biomaterials (1999), 20(19), 1799-1806
 CODEN: BIMADU; ISSN: 0142-9612
 PB Elsevier Science Ltd.
 DT Journal
 LA English
 AB With respect to the effect of material factors on **calcium phosphate** biomaterial-induced osteogenesis, the osteoinductive property of 2 kinds of **porous hydroxyapatite** ceramics, which were made by different producers, was investigated in dorsal muscles of dogs. One **hydroxyapatite** ceramic (S-HA), macroporous **implants** with rough pore walls contg. abundant micropores, was made by Sichuan Union University (China); the other **hydroxyapatite** ceramic (J-HA), **porous implants** with smooth macropore walls composed of regularly aligned crystal grains, was provided by Mitsubishi Ceramic Int. (Japan). Different tissue response was detected histol. and microradiog. after the ceramic samples had been implanted in dorsal muscles of dogs for 3 and 6 mo. Bone formation was found in S-HA at 3 mo, which increased at 6 mo. In contrast, no bone formation was detected in J-HA at both 3 and 6 mo. With the special architecture, **calcium phosphate** ceramic can induce bone formation in soft tissue. As both materials were very similar in their chem. and crystallog. structures, but varied in their microstructures, the latter seem to be an important factor affecting the osteoinductive capacity of **calcium phosphate** ceramics. Thus, by controlling the prepn. of **calcium phosphate** ceramic, bone substitutes with intrinsic osteoinductive property can be developed from **calcium phosphates**.

L5 ANSWER 292 OF 806 CA COPYRIGHT 2003 ACS
 AN 132:83573 CA
 TI The effect of heat treatment on the morphology of D-gun sprayed
hydroxyapatite coatings
 AU Erkmen, Ziya Engin
 CS Materials Science Division, Lawrence Berkeley National Lab, Berkeley, CA,
 94720, USA
 SO Journal of Biomedical Materials Research (1999), 48(6), 861-868
 CODEN: JBMRBG; ISSN: 0021-9304
 PB John Wiley & Sons, Inc.
 DT Journal
 LA English
 AB In this study, the morphol. of the **hydroxyapatite** (HA) coatings
 sprayed on Ti alloy samples by Detonation Gun Spray (D-Gun) and the effect
 of aging before and after heat treatment in physiol. soln. were obsd.
 Cross-sectional **porosity** and percentages of amorphous and
 crystal phase were measured using optical, electron microscopy, and X-ray
 diffraction anal. Differential Thermogravimetric Anal. (DTA) was
 performed to est. the glass-cryst. phase transformation temps.
 Heat-treatment at 300, 500, 700, 800 and 1200.degree. were carried out to
 confirm DTA results. As a final anal., the aging effect using Ringer's
 soln. for 1 wk on heat-treated and non-heat-treated samples was measured.
 It was obsd. that, in D-Gun-sprayed samples, the cross-sectional
porosity stayed in the accepted 5% range as reported for other
 spraying techniques. On the other hand, surface **porosity**
 measured by using the water immersion method remained in the conventional
porosity limit of 15% for non-heat-treated samples.
 Heat-treatment had a small influence on the **porosity** while the
 crystallinity increased considerably; in addn., aging had little effect on
 HA crystallinity for heat treated samples. Thus, D-gun-sprayed HA
 coatings had lower **porosity** and better integrity than other
 coatings, due to which we can expect better performance during in vivo
 applications.
 RE.CNT 20 THERE ARE 20 CITED REFERENCES AVAILABLE FOR THIS RECORD
 ALL CITATIONS AVAILABLE IN THE RE FORMAT

L5 ANSWER 291 OF 806 CA COPYRIGHT 2003 ACS
AN 132:83587 CA
TI Influence of surface microstructure on the reaction of the active ceramics
in vivo
AU Yokozeki, H.; Hayashi, T.; Nakagawa, T.; Kurosawa, H.; Shibuya, K.; Ioku,
K.
CS Department of Orthopaedic Surgery, Faculty of Medicine, The University of
Tokyo, Tokyo, 113, Japan
SO Journal of Materials Science: Materials in Medicine (1998), 9(7), 381-384
CODEN: JSMMEI; ISSN: 0957-4530
PB Kluwer Academic Publishers
DT Journal
LA English
AB When **porosity** and macro-pore size differ in the same ceramic,
the mode of bone regeneration and the degrdn. of ceramics in vivo is said
to be different. However, the reactions in vivo of ceramics that have a
different microstructure with the same **porosity** and the same
macro-pore size, are not so far known. In this study, 2 kinds of .beta.-
tricalcium phosphate (TCP) that had different
microstructures but the same **porosity** and macro-pore size, were
manufd. These TCP were implanted in the distal femurs of 20 mature male
rabbits, and their resp. areas of ceramics and of regenerated bone were
measured after 4, 12 and 24 wk. In both TCPs, the regenerated bone
similarly decreased from 4-24 wk in a different way. The area of ceramics
in one of these TCPs significantly decreased gradually throughout the
observation period. On the other hand, the other TCP showed no marked
decrease during the same period. This suggested a possibility that the
difference in microstructure has a large effect on the reaction of the
ceramics in the bone.
RE.CNT 15 THERE ARE 15 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L5 ANSWER 287 OF 806 CA COPYRIGHT 2003 ACS
 AN 132:112999 CA
 TI Evaluation of human recombinant bone morphogenetic protein-2-loaded
tricalcium phosphate implants in rabbits' bone
 defects
 AU Laffargue, Ph.; Hildebrand, H. F.; Rtaimate, M.; Frayssinet, P.; Amoureux,
 J. P.; Marchandise, X.
 CS Laboratoire de Biophysique, Unite Programmee de Recherche et
 d'Enseignement Scientifique, Equipe d'Accueil (UPRES EA) 1049, Faculte de
 Medecine, Lille, Fr.
 SO Bone (New York) (1999), 25(2, Suppl.), 55S-58S
 CODEN: BONEDL; ISSN: 8756-3282
 PB Elsevier Science Inc.
 DT Journal
 LA English
 AB **Porous .beta.-tricalcium phosphate**
 (.beta.TCP) has osteoconductive properties. The adsorption of human
 recombinant bone morphogenetic protein-2 (rhBMP-2) onto TCP could realize
 an osteoinductive bone substitute. We evaluated it on an animal model by
 dual-energy x-ray absorptiometry (DEXA) and solid-state 31P-NMR
 spectroscopy. .beta.TCP cylinders loaded with rhBMP-2 were implanted into
 rabbits' femoral condyle bone defects, and .beta.TCP alone as control into
 the contralateral femur. We studied 2 different doses of rhBMP-2 (10 and
 40 .mu.g) on 2 groups of 4 animals. Evaluation consisted in radiog.,
 histol., and histomorphometry, DEXA, and NMR spectroscopy using an
 original method of quantification. With both doses of rhBMP-2, we obsd.
 on radiographs an increase of trabecular bone around **implants**.
 Histol. showed resorption of the ceramic, trabecular bone with osteoblasts
 and osteoid substance around the **implants**, and colonization
 inside the **porous** .beta.TCP by new bone formed.
 Histomorphometry showed that the osteoid surface (OS/BS) was greatest with
 the high dose of rhBMP-2. The difference was slight between the low dose
 of rhBMP-2 and control. DEXA showed a dose-dependent increase of bone
 mineral d. of rhBMP-2-loaded .beta.TCP vs. control. NMR spectroscopy
 confirmed that the amt. of new bone formed in .beta.TCP was greater when
 .beta.TCP carried rhBMP-2, and increased with the dose of rhBMP-2 used.
 .beta.TCP was a good matrix for rhBMP-2, which gave it osteoinductive
 properties in an orthotopic site, in a dose-dependent manner. Thus, such
 composite biomaterial seems to be of great interest in reconstructive bone
 surgery. Further studies are needed in clin. practice to det. optimal
 doses.
 RE.CNT 9 THERE ARE 9 CITED REFERENCES AVAILABLE FOR THIS RECORD
 ALL CITATIONS AVAILABLE IN THE RE FORMAT

L5 ANSWER 283 OF 806 CA COPYRIGHT 2003 ACS
AN 132:156727 CA
TI Aqueous tape-casting of bioactive A/W-Al₂O₃ with low temperature sintering
AU Zeng, Yu-Ping; Jiang, Dong-Liang; Peter, Grail
CS State Key Lab of High Performance Cermics and Superfine Structure,
Shanghai Institute of Ceramics, Chinese Academy of Sciences, Shanghai,
200050, Peop. Rep. China
SO Wuji Cailiao Xuebao (1999), 14(4), 569-574
CODEN: WCXUET; ISSN: 1000-324X
PB Kexue Chubanshe
DT Journal
LA Chinese
AB For the synchronous sintering of Al₂O₃ and HAP, it is necessary to
decrease the sintering temp. of Al₂O₃ to prevent decompn. of HAP. A/W
bioglass which has low m.p. and bioactivity was selected as the liq. phase
sintering additive, perfect A/W-Al₂O₃ slurries and A/W-Al₂O₃ tapes were
fabricated and various factors which have great effect on the properties
of slurries and the processing of tape casting were investigated. Because
the bioglass evaps. easily at high temp., the densities of sample are
greatly effected by sintering time and temp. But the relative d. of the
samples prepd. at 1300.degree.C can be reached up to 99.17%, therefore,
the A/W-Al₂O₃ and HAP tapes can be sintered together at low temp., it is
possible to prep. the laminated bioactivity **implant** with
porous bioactive HAP and A/W-Al₂O₃ substrate.

L5 ANSWER 281 OF 806 CA COPYRIGHT 2003 ACS
AN 132:156750 CA
TI A novel processing method for the fabrication of **porous** ceramic
composites for application as bone replacements
AU Hignite, Michelle L.; Crimp, Melissa J.
CS Department of Materials Science and Mechanics, Michigan State University,
East Lansing, MI, 48824-1226, USA
SO Advances in Science and Technology (Faenza, Italy) (1999), 28(Materials in
Clinical Applications), 251-258
CODEN: ASET5
PB Techna
DT Journal
LA English
AB Fiber reinforced **porous** ceramic composites have been fabricated
using a modified **foaming** process that eliminates the use of
binders. This method is repeatable, economical, fast and has been applied
to alumina fiber reinforced alumina (Al₂O₃(f)/Al₂O₃), Al₂O₃ fiber
reinforced **hydroxyapatite** (Al₂O₃(f)/HA) and preliminary
investigations have begun using HA fiber reinforced HA composites
(HA(f)/HA). Al₂O₃(f)/Al₂O₃ composites, having as little as 10-20% d. and
interconnected **porosity** have been designed for use as molten
metal filters. With fibrous reinforcement, these Al₂O₃(f)/Al₂O₃
reticulate ceramic composites have high compressive strengths up to 224
kPa as the **porosity** approaches 84%. The Al₂O₃(f)/HA and
HA(f)/HA composites have been fabricated for use as bone substitutes where
the fibers are included to provide added strength and toughness and the
pore size is optimized to promote bone in-growth. Increases in fiber vol.
percent from 2 to 3.1% have been shown to increase the compressive
strength from 0.22 to 0.89 MPa in Al₂O₃(f)/HA composites. In the HA
matrix composites, controlling the amts. of powder and hydrogen peroxide
during green body processing resulted in av. pore sizes between 223 and
500 .mu.m which are in the range applicable for bony in-growth.
RE.CNT 17 THERE ARE 17 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L5 ANSWER 276 OF 806 CA COPYRIGHT 2003 ACS
AN 132:171015 CA
TI Macroporous synthetic **hydroxyapatite** bioceramics for bone
substitute applications
AU Thomas, M. E.; Richter, P. W.; Van Deventer, T.; Crooks, J.; Ripamonti, U.
CS Manufacturing and Materials Division, CSIR, Pretoria, 0001, S. Afr.
SO South African Journal of Science (1999), 95(8), 359-362
CODEN: SAJSAR; ISSN: 0038-2353
PB Foundation for Research Development
DT Journal
LA English
AB An improved strategy is described for the manuf. of macroporous
hydroxyapatite bioceramics for bone substitute applications. This
is based on a modified fugitive phase technique, which allows prodn. of
relatively open, high-strength devices. Properties of ceramics manufd. by
this route are compared with those fashioned by 2 conventional methods.
Aspects of design are discussed in terms of requirements for intrinsic
osteointductivity in vivo.
RE.CNT 11 THERE ARE 11 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

LS ANSWER 275 OF 806 CA COPYRIGHT 2003 ACS
AN 132:171028 CA
TI Ultrastructure investigation of **porous tricalcium phosphate** ceramics after implantation into rabbit femur
AU Chen, Qin; He, Jiping; Zheng, Qixin; Yu, Naiteng; Lin, Wenmei; Li, Shipu; Chen, Fang; Yan, Yuhua
CS Second Affiliated Hospital, Hubei Medical University, Wuhan, 430071, Peop. Rep. China
SO Zhongguo Shengwu Yixue Gongcheng Xuebao (1999), 18(3), 262-272
CODEN: ZSYXEI; ISSN: 0258-8021
PB Zhongguo Yixue Kexueyuan
DT Journal
LA Chinese
AB Ultrastructure of host bone tissue and biodegradable **porous tricalcium phosphate** (.beta.-TCP) ceramics **implants** were studied using polarizing microscopy and scan electron microscopy-EDXA 45 days after implantation into femoral condyle cavities of rabbits. The results showed the process of biodegrdn. and bone formation of the .beta.-TCP materials. The ultrastructure provided evidence for understanding biodegrdn. and bone-bonding mechanisms. Macrophages and osteoclast took part in degrdn. of .beta.-TCP ceramics by phagocytosis and extracellular resorption. Due to the presence of osteoblasts and osteocytes, the osteogenesis was completed. Moreover, a family of phosphorus-dependent and calcium-dependent enzymes were thought to play catalysis and active role in the biochem. reaction of bio-transformation of .beta.-TCP material, so the .beta.-TCP **porous** material could take part in new bone formation of host, thus showing its unique advantage.

L5 ANSWER 273 OF 806 CA COPYRIGHT 2003 ACS

AN 132:185392 CA

Correction of: 125:338968

TI The bonding behavior of DP-Bioglass and bone tissue

AU Lin, Feng-Huei; Yao, Chun-Hsu; Huang, Chin-Wang; Liu, Hwa-Chang; Sun, Jui-Sheng; Wang, Cheng-Yi

CS Coll. Medicine, National Taiwan Univ., Taipei, Taiwan

SO Materials Chemistry and Physics (1996), 46(1), 36-42

CODEN: MCHPDR; ISSN: 0254-0584

PB Elsevier

DT Journal

LA English

AB There are many reports of the surface reactions of surface-active ceramics. A Ca-P-rich layer was found on the surface of these bioactive ceramics implanted in bone tissue, a chem. bond having been established between the mineralized matrix of the bone and the **apatite** layer of the bioactive ceramic. It has been reported that the direct bonding of bone to DP-Bioglass was due to the deposition and subsequent mineralization of org. bone matrix at the outer layer of the **implant**. Thus the strength of the bonding of DP-Bioglass with bone structure is expected to be such that it will overcome the fixing problems of joint replacement and improved the long-term performance of prostheses of the bioactive glass is coated onto alloys or stainless steel. In this study, DP-Bioglass was pressed into a steel disk, 6 mm in diam. and 5 mm thick, under a hydrostatic pressure of 270 MPa, and then sintered at 810.degree.C for 2 h. The DP-Bioglass disks were implanted into the condyle are of mature male rabbits for 2, 4, 8, 16 and 32 wk. The failure load, when an **implant** detached from the bone or when the bone itself broke, was measured by a push-out test. Sintered **hydroxyapatite** bioceramic was used in a control group and the results were compared with those using DP-Bioglass. The histol. evaluation and histomorphometric investigation are described in the study to demonstrate the bonding behavior between DP-Bioglass and bone tissue.

AN 132:241868 CA
TI Production of **porous hydroxyapatite** by the gel-casting
of **foams** and cytotoxic evaluation
AU Sepulveda, P.; Binner, J. G. P.; Rogero, S. O.; Higa, O. Z.; Bressiani, J.
C.
CS Departamento de Engenharia de Materiais, Universidade Federal de Sao
Carlos, Sao Carlos, 13565-905, Brazil
SO Journal of Biomedical Materials Research (2000), 50(1), 27-34
CODEN: JBMRBG; ISSN: 0021-9304
PB John Wiley & Sons, Inc.
DT Journal
LA English
AB This study presents the manuf. of highly **porous**
hydroxyapatite by a novel technique that employs the
foaming of suspensions prior to the in situ polymn. of org.
monomers contained in the compns. This method produces strong gelled
bodies with up to 90% **porosity** that can withstand machining in
the green state. Complex-shaped components can be obtained if the process
comprises casting in one of the processing steps. The org. additives are
eliminated at temps. above 300.degree.C, and sintering is carried out for
consolidation of the ceramic matrix. Spherical interconnected cells with
sizes ranging from 20 to 1000 .mu.m characterize the **porous**
structure, depending on the specimen d. Cytotoxicity tests were conducted
on exts. from sintered HA **foams** based on a quant. method of cell
colony formation and the detn. of cell death after indirect contact of the
porous material with mammalian cells. This in vitro test of biol.
evaluation revealed that the original purity of the biomedical-grade
hydroxyapatite powder was affected neither through processing nor
by the employed reagents.

L5 ANSWER 265 OF 806 CA COPYRIGHT 2003 ACS
 AN 132:313631 CA
 TI Optimizing osteoinduction within **hydroxyapatite** biomaterials
 AU Song, Liansheng; Gosain, Arun K.; Amarante, Marco T.; Nagy, Paul G.;
 Wilson, Charles R.; Toth, Jeffrey M.; Chow, Larry C.; Yamaguchi, Mark;
 Ricci, John L.
 CS Division of Plastic Surgery, The Medical College of Wisconsin, Milwaukee,
 WI, USA
 SO Surgical Forum (1998), 49, 663-665
 CODEN: SUFOAX; ISSN: 0071-8041
 PB American College of Surgeons
 DT Journal
 LA English
 AB The present study investigated HA-derived biomaterials in an adult sheep
 model to det. whether these biomaterials demonstrate consistent
 osteoinduction when implanted in soft tissue sites removed from adjacent
 bone, and whether osteoinduction can be optimized by manipulating the
 compn. and **porosity** of the **implants**. Disks measuring
 16.8 x 5 mm were prepd. from either ceramic (CER) or cement paste (CP)
 derivs. of HA and beta-**tricalcium phosphate** (TCP) as
 follows: (A) ceramic forms: (1) HA-CER (Interpore), (2) 60% HA/40%
 TCP-CER; (B) cement paste forms: (1) HA-CP, (2) 60% HA/40% TCP-CP, (3) 20%
 HA/80% TCP-CP. These biomaterials were implanted in both s.c. (SC) and
 i.m. (IM) soft tissue pockets in 10 adult sheep. Animals were killed 1 yr
 after implantation, and the biomaterials analyzed. The present study is
 the 1st true demonstration of osteoinduction within HA-derived
 biomaterials. The authors' study indicates that osteoinduction is
 maximized by maintaining a **porous** architecture, which is best
 achieved in CER forms of HA. Macropores can be introduced in CP forms of
 HA to render them osteoinductive if over half the **implant**
 consists of a rapidly resorbing component such as TCP. However,
porosity and resultant bone formation are inconsistent and occur
 at the expense of significant vol. redn. of the original **implant**

L5 ANSWER 251 OF 806 CA COPYRIGHT 2003 ACS

AN 132:352673 CA

TI Enhancement of the in vivo osteogenic potential of marrow/
hydroxyapatite composites by recombinant human bone morphogenetic
protein-2

AU Noshi, T.; Yoshikawa, T.; Ohgushi, H.; Dohi, Y.; Ikeuchi, M.; Horiuchi,
K.; Sugimura, M.; Ichijima, K.

CS Departments of Oral and Maxillofacial Surgery, Nara Medical University,
Nara, 634-8522, Japan

SO Bioceramics, Proceedings of the International Symposium on Ceramics in
Medicine (1999), 12, 241-244

CODEN: BPCMFY

PB World Scientific Publishing Co. Pte. Ltd.

DT Journal

LA English

AB A composite of marrow mesenchymal stem cells and **porous**
hydroxyapatite (HA) has in vivo osteogenic potential. To
investigate factors enhancing the osteogenic potential of marrow/HA
composites, we used recombinant human bone morphogenetic protein-2
(rhBMP-2). Marrow/HA composites or composites contg. marrow mesenchymal
stem cells, rhBMP-2, and HA (marrow/BMP/HA composites) were implanted s.c.
in 7-wk-old male Fischer rats. BMP/HA composites and HA alone were also
implanted. The **implants** were harvested after 2 and 4 wk.
Histol., obvious de novo bone formation together with active osteoblasts
was seen at both 2 and 4 wk in many pores of the marrow/BMP/HA composites.
The marrow/HA composites did not induce bone formation at 2 wk, but showed
moderate bone formation at 4 wk. In contrast, neither the BMP/HA
composites nor HA alone induced bone formation at any time after
implantation. The combination of marrow mesenchymal stem cells,
porous HA, and BMP synergistically enhances osteogenic potential
and that the composites can be utilized effectively in osseous
reconstructive surgery.

RE.CNT 11 THERE ARE 11 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

ANSWER 240 OF 806 CA COPYRIGHT 2003 ACS

AN 133:79281 CA

TI Preparation of a **porous tricalcium phosphate**
bioceramic

AU Wu, Jianfeng; Xu, Xiaohong

CS Wuhan University of Technology, Peop. Rep. China

SO Taoci Xuebao (1999), 20(2), 104-107

CODEN: TAXUFH

PB Taoci Xuebao Zazhishe

DT Journal

LA Chinese

AB By reforming the constituents and prepn. of **porous tricalcium phosphate** (PTCP), the authors obtained a new bioceramic material with good biol. and mech. properties. The effect of the compn., microstructure of the PTCP material on its properties was analyzed by TC-DTA, XRD, SEM, etc. The effect on the biol. and phys. properties of this material was discussed.

L5 ANSWER 235 OF 806 CA COPYRIGHT 2003 ACS
 AN 133:125235 CA
 TI Osteoconduction at **porous hydroxyapatite** with various
 pore configurations
 AU Chang, Bong-Soon; Lee, Choon-Ki; Hong, Kug-Sun; Youn, Hyuk-Joon; Ryu,
 Hyun-Seung; Chung, Sung-Soo; Park, Kun-Woo
 CS Department of Orthopedic Surgery, Seoul National University College of
 Medicine, Clinical Research Institute, Seoul National University Hospital,
 Seoul, 110-744, S. Korea
 SO Biomaterials (2000), 21(12), 1291-1298
 CODEN: BIMADU; ISSN: 0142-9612
 PB Elsevier Science Ltd.
 DT Journal
 LA English
 AB To assess the histol. response and the reinforcing effects of bone
 ingrowth within **porous hydroxyapatite** (HA)
implants depending on pore geometry, four kinds of
 cylindrical-type with parallel linear pores (.phi.50, 100, 300, 500
 .mu.m), one kind of sponge-type with irregular interconnecting pores
 (.phi.250 .mu.m) and one cross-type with crossing linear pores (.phi.100
 .times. 120 .mu.m) of **porous** HA were prepd. Eighty-four rabbits
 were divided into six groups, and a 5 .times. 5 .times. 7 mm sized
porous HA block was inserted through the medial cortical window of
 the proximal tibia. Histomorphol. changes were examd. using light and
 SEM. A biomech. compression test was performed using material test
 machines. After implantation, the **implants** showed different
 histol. changes depending on pore geometry. Active osteoconduction was
 also found in the .phi.50 .mu.m sized cylindrical-type **porous**
 HA. Evidence of remodeling of new bone and bone marrow formation within
porous HA was found in the larger cylindrical-types (.phi.300, 500
 .mu.m), and the sponge- and cross-types. The biomech. test showed that
 the ultimate compressive strength increased significantly in the .phi.300
 .mu.m sized cylindrical-type, and in the sponge- and cross-types eight
 weeks after implantation. **Porous** HA with cylindrical pores
 could be a useful graft material due to its strength, osteocond. and the
 ease with which its pore geometry can be controlled.
 RE.CNT 22 THERE ARE 22 CITED REFERENCES AVAILABLE FOR THIS RECORD
 ALL CITATIONS AVAILABLE IN THE RE FORMAT

L5 ANSWER 234 OF 806 CA COPYRIGHT 2003 ACS

AN 133:125240 CA

TI Morphometric and mechanical evaluation of titanium **implant**
integration: comparison of five surface structures

AU Svehla, M.; Morberg, P.; Zicat, B.; Bruce, W.; Sonnabend, D.; Walsh, W. R.

CS Orthopaedic Research Laboratories, Department of Surgery, Prince of Wales
Hospital, University of New South Wales, Sydney, 2031, Australia

SO Journal of Biomedical Materials Research (2000), 51(1), 15-22

CODEN: JBMRBG; ISSN: 0021-9304

PB John Wiley & Sons, Inc.

DT Journal

LA English

AB Achieving a stable bone-**implant** interface is an important factor
in the long-term outcome of joint arthroplasty. In this study, we
employed an ovine bicortical model to compare the bone-healing response to
5 different surfaces on titanium alloy **implants**: grit blasted
(GB), grit blasted plus **hydroxyapatite** (50 .mu.m thick) coating
(GBHA), Porocoat (PC), Porocoat with HA (PCHA) and smooth (S). Push-out
testing, and backscatter SEM imaging were employed to assess the healing
response at 4, 8, and 12 wk. Push-out testing revealed PC and PCHA
surfaces resulted in significantly greater mech. fixation over all other
implant types at all time points. HA coating on the grit-blasted
surface significantly improved fixation at 8 and 12 wk. The addn. of HA
onto the **porous** coating did not significantly improve fixation
in this model. Quantification of in growth/on growth from SEM images
revealed that HA coating of the grit-blasted surfaces resulted in
significantly more on growth at 4 wk.

RE.CNT 20 THERE ARE 20 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L5 ANSWER 223 OF 806 CA COPYRIGHT 2003 ACS
 AN 133:198752 CA
 TI Method of coating prosthetic **implant** with a **calcium phosphate** compound
 IN Gao, Yufei; Campbell, Allison A.
 PA Battelle Memorial Institute, USA
 SO U.S., 7 pp.
 CODEN: USXXAM
 DT Patent
 LA English
 FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 6113993	A	20000905	US 1998-182741	19981028
PRAI	US 1998-182741		19981028		

AB The present invention is a method of coating a substrate with a **calcium phosphate** compd. using plasma enhanced MOCVD. The substrate is a solid material that may be **porous** or non-**porous**, including but not limited to metal, ceramic, glass and combinations thereof. The coated substrate is preferably used as an **implant**, including but not limited to orthopedic, dental and combinations thereof. **Calcium phosphate** compd. includes but is not limited to **tricalcium phosphate** (TCP), **hydroxyapatite** (HA) and combinations thereof. TCP is preferred on a titanium **implant** when **implant** resorbability is desired. HA is preferred when the bone bonding of new bone tissue into the structure of the **implant** is desired. Either or both of TCP and/or HA coated **implants** may be placed into a soln. with an agent selected from the group of protein, antibiotic, antimicrobial, growth factor and combinations thereof that can be adsorbed into the coating before implantation. Once implanted, the release of TCP will also release the agent to improve growth of new bone tissues and/or to prevent infection.

RE.CNT 6 THERE ARE 6 CITED REFERENCES AVAILABLE FOR THIS RECORD
 ALL CITATIONS AVAILABLE IN THE RE FORMAT

L5 ANSWER 214 OF 806 CA COPYRIGHT 2003 ACS
AN 133:313421 CA
TI Biomimetic coatings on orthopedic **implants**: a review
AU De Groot, K.; Wen, H. B.; Liu, Yuelian; Layrolle, Pierre; Barrere, Florence
CS Iso Tis BV, Bilthoven, 3723 MB, Neth.
SO Materials Research Society Symposium Proceedings (2000), 599(Mineralization in Natural and Synthetic Biomaterials), 109-116
CODEN: MRSPDH; ISSN: 0272-9172
PB Materials Research Society
DT Journal; General Review
LA English
AB A review, with 7 refs. In bone replacement surgery, replacement of joints (of hip, knee, finger and jaw) is a major sub discipline, requiring mech. strong and biol. compatible, or biocompatible, **implants**. Since mech. strength can only be achieved with metals that lack the required biocompatibility, surface treatments to improve that lack have been studied extensively. Since the mineral phase of bone consists of various calcium salts, the most relevant one being (carbonated) **apatite**, the surface treatments of choice are coatings of such salts on orthopedic **implants** have been successfully developed. (Bulk ceramics of CaP are too brittle to be used for load bearing **implants**). Although currently used coatings as obtained by plasma spraying have been highly successful, the high temp. and line-of-sight nature of the plasma spray process prevent (1) coatings to be deposited on **implants** made of polymer composites, (2) coatings to be deposited on complex surfaces and/or within **porous implants** and (3) biol. mols. such as growth factors or antibiotics to be included in the coating. Therefore, we and several other research groups have focussed our attention to so called biomimetic coatings, that are produced at ambient temp. by a pptn. process from fluids resembling body fluids in their inorg. compn. In this presentation, we will give a review of some current developments on biomimetic coatings.
RE.CNT 7 THERE ARE 7 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L5 ANSWER 211 OF 806 CA COPYRIGHT 2003 ACS
AN 133:313551 CA
TI A novel method for solution deposition of **hydroxyapatite** on to
three dimensionally **porous** metallic surfaces: peri-
apatite HA
AU Zitelli, Joseph P.; Higham, Paul
CS Advanced Technology Group, Stryker Howmedica Osteonics, Rutherford, NJ,
USA
SO Materials Research Society Symposium Proceedings (2000),
599(Mineralization in Natural and Synthetic Biomaterials), 117-128
CODEN: MRSPDH; ISSN: 0272-9172
PB Materials Research Society
DT Journal
LA English
AB A method for applying HA coatings to metallic surfaces, without the use of
high temp. plasma spraying, has been developed. The HA coating is pptd.
in an aq. soln. under conditions similar to those occurring in the body
during bone formation. This surface mineralization process results in a
coating which is highly cryst. and 100% HA. Processing and
characterization experimentation and results are included in the paper.
The coating method has the ability to penetrate macroporous (> 100 .mu.
pores) metal structures and coat the undersides and interior surfaces of
the areas designed for bone ingrowth on orthopedic devices used for joint
replacements. This ability to coat all around a surface is the basis for
the name Peri-**Apatite** HA. Electron microscopy is presented
illustrating the coverage and morphol. of the coating. The Peri-
Apatite HA coating is currently used on both knee joint
replacement and hip joint replacement **implants**.
RE.CNT 16 THERE ARE 16 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L5 ANSWER 381 OF 806 CA COPYRIGHT 2003 ACS
AN 129:153182 CA
TI Study of **porous** interconnections of bioceramic on cellular
rehabitation in vitro and in vivo
AU Lu, J. X.; Flautre, B.; Anselme, K.; Gallur, A.; Descamps, M.; Thierry,
B.; Hardouin, P.
CS IRMS Institut Calot, Berck-Sur-Afer, 62608, Fr.
SO Bioceramics, Proceedings of the International Symposium on Ceramics in
Medicine (1997), 10, 583-586
CODEN: BPCMF
PB Elsevier Science Ltd.
DT Journal
LA English
AB Our study would find the role of **porous** interconnections (PIC)
on bone ingrowth and material degrdn. in **tricalcium**
phosphate beta (.beta.-TCP) with about 50% **porosity**, a
size of 100-300 .mu.m macropores and of 30-100 .mu.m PIC, In vitro. human
osteoblasts were cultivated on disks with two delays: 14 and 28 days. In
vivo. **implants** were implanted in middle diaphysis of both femurs
with two delays: 12 and 24 wk. The in vitro and in vivo samples were
obsd. with histomorphometry (HMM) and SEM. In vitro results show that
human osteoblasts penetrate sizes of PIC over 20 .mu.m diam. (dia.), set
up and grow inside the bioceramic macropores. In vivo HMM results show
that PIC directly influence bone ingrowth inside pores and material
degrdn. We notice that a PIC size over 50 .mu.m dia. allows formation of
new bone ingrowth inside the pores. The PIC d. expresses the link between
pores inside **porous** materials, assures the cells proliferation
and tissular differentiation by extra cellular and vascular exchanges. In
resorbable materials, pores and PIC initial densities play a more
important role than their sizes.

AN 129:221163 CA
TI Characterization of **hydroxyapatite** bio-coatings processed by
electrocrystallization technique
AU Han, Yong; Xu, Kewei; Lu, Jian
CS State-Key Laboratory for Mechanical Behaviour of Materials, Xi'an Jiaotong
University, Peop. Rep. China
SO Surface Modification Technologies XI, Proceedings of the International
Conference on Surface Modification Technologies, 11th, Paris, Sept. 8-10,
1997 (1998), Meeting Date 1997, 379-387. Editor(s): Sudarshan, T. S.;
Jeandin, M.; Khor, K. A. Publisher: Institute of Materials, London, UK.
CODEN: 66MAA8
DT Conference
LA English
AB Highly pure brushite ($\text{CaHPO}_4 \cdot 2\text{H}_2\text{O}$) coatings on **porous** Ti6Al4V
substrate were prepd. by electrodeposition from aq. electrolytes. The
influence of hydrothermal treatment temp. on brushite-to-
hydroxyapatite conversion and the morphol. and phase compn. of
hydroxyapatite (HAP) coatings are studied. The content, Ca/P atom
ratio, grain size and pore size of HAP in coatings increases with
increasing hydrothermal treatment temp. and that at the reasonable temp.,
highly pure HAP coatings with needle-like crystals and calcium-deficient
form can be obtained, which are similar to that of **calcium**
phosphate in human bone. By the means of sintering pure
calcium-deficient **hydroxyapatite** coating on Ti6Al4V in air at
800.degree., the bonding strength of coating is improved, and at the same
time the dense TiO_2 film is formed on the substrate surface.

L5 ANSWER 327 OF 806 CA COPYRIGHT 2003 ACS
AN 131:23422 CA
TI **Porous hydroxyapatite**-dodecyl phosphate composite film
on titania-titanium substrate
AU Soten, Ivana; Ozin, Geoffrey A.
CS Lash Miller Chemical Laboratories, Materials Chemistry Research Group,
University of Toronto, Toronto, ON, M5S 3H6, Can.
SO Journal of Materials Chemistry (1999), 9(3), 703-710
CODEN: JMACEP; ISSN: 0959-9428
PB Royal Society of Chemistry
DT Journal
LA English
AB Synthetic analogs of bone are being actively pursued as materials for
biomedical applications in the field of bone replacement, augmentation and
repair. Numerous stringent criteria have to be met for a biomaterial to
be considered as an acceptable bone **implant**, including the
ability to integrate into bone and not cause any deleterious side effects.
In this article we describe a materials chem. approach to synthesizing a
new type of bone **implant** material. The strategy involves the
spontaneous growth, under aq. physiol. pH conditions, of an oriented
hydroxyapatite film with micron dimension **porosity**, on
the surface of a layer of TiO₂ that has been sputter deposited on Ti
metal. This procedure creates desirable co-crystd. phases of
hydroxyapatite (OHAp) and octacalcium phosphate (OCP) with
preferred orientation resp. along the [001] and [101] directions.
Subsequently, a calcium dodecyl phosphate mesolamellar phase has been
grown within these oriented **porous** films to create a
multilayered chem. composite CaDDP-OHAp-TiO₂-Ti in which the CaDDP phase
is stereochem. and charge matched with the OHAp.
RE.CNT 29 THERE ARE 29 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

ANSWER 318 OF 806 CA COPYRIGHT 2003 ACS

AN 131:78391 CA

TI **Porosity** control of **hydroxyapatite implants**

AU Vaz, L.; Lopes, A. B.; Almeida, M.

CS Department of Ceramics and Glass Engineering, UIMC, University of Aveiro, Aveiro, 3810, Port.

SO Journal of Materials Science: Materials in Medicine (1999), 10(4), 239-242
CODEN: JSMMEJ; ISSN: 0957-4530

PB Kluwer Academic Publishers

DT Journal

LA English

AB The characterization of **hydroxyapatite** (HAp) bodies was carried out by using a multiple slip-casting technique, in order to obtain dual-layer samples with differential sized **porosities**. The external layer, because of its **porosity**, controlled by the addn. of org. compds. (polyacrylate, PVC), will promote bone ingrowth. The internal denser layer, due to the addn. of lithium phosphate (Li_3PO_4) as sintering additive, will give mech. resistance to the **implant**. HAp aq. suspensions were characterized by rheol. measurements. SEM and intrusion mercury porosimetry were used to characterize sintered bodies. Thus, it is possible to introduce gross **porosity** in HAp bodies by the addn. of org. compds. A compatible shrinking of the layers during the sintering process and a good frequency of pores with an appropriate size in the external layer can be achieved with the use of org. additives.

RE.CNT 7 THERE ARE 7 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L5 ANSWER 301 OF 806 CA COPYRIGHT 2003 ACS
AN 131:303349 CA
TI **Porous hydroxyapatite** ceramics and their ability to be
fixed by commercially available screws
AU Ono, M. D. Ichiro; Tateshita, M. D. Tohru; Nakajima, Takehiko
CS Division of Plastic and Reconstructive Surgery, Department of Dermatology,
School of Medicine, Fukushima Medical University, Fukushima, 960-1295,
Japan
SO Biomaterials (1999), 20(17), 1595-1602
CODEN: BIMADU; ISSN: 0142-9612
PB Elsevier Science Ltd.
DT Journal
LA English
AB We developed **porous hydroxyapatite** ceramics (HAP)
which are screw fixable and evaluated the fixing abilities of com.
available screws using pull-out tests with the HAP **implants**.
The fixing abilities were higher in the following order: Leibinger micro
PLUS titanium screw > Osteomed M3 titanium screw > Leibinger std. mini
screw > Martin-drill free screw. In preliminary examns., the fixing
ability of each of the screws differed according to the hole diam. and
depth of insertion but if inserted under optimum conditions, all were
deemed to have adequate fixing ability for clin. applications. Therefore,
screw systems are superior for fixing HAP **implants** to
surrounding bone than the use of thread or wire. Specifically,
Leibinger's micro PLUS titanium screws system seems to be a good option
currently. The fact that effective fixation was achieved should result in
a further increase in the clin. use of synthetic **porous** HAP
implants whose **porosity** and pore size are completely
controlled for those purposes.
RE.CNT 22 THERE ARE 22 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT